

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C. 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 06 September 2000 (06.09.00)	
International application No. PCT/US99/30845	Applicant's or agent's file reference 4925-30PCT
International filing date (day/month/year) 23 December 1999 (23.12.99)	Priority date (day/month/year) 29 December 1998 (29.12.98)
Applicant OLKKONEN, Mikko et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
24 July 2000 (24.07.00)

☐ in a notice affecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Olivia TEFY
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: MICHAEL C. STUART
COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 4925-30PCT	Date of Mailing <i>(day/month/year)</i> 25 APR 2000
International application No. PCT/US99/30845	International filing date <i>(day/month/year)</i> 23 DECEMBER 1999
Applicant OLKKONEN, MIKKO	

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 *bis* 1 and 90 *bis* 3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

Enrique L. Santiago
Enrique L. Santiago

Telephone No. (703) 306-5908

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 4925-30PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US99/30845	International filing date (<i>day/month/year</i>) 23 DECEMBER 1999	(Earliest) Priority Date (<i>day/month/year</i>) 29 DECEMBER 1998
Applicant OLKKONEN, MIKKO		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (See Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. _____

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☒ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/30845

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04L 12/66

US CL : 370/352

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 370/352,356,389,401,466

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US 5,867,494 A (KRISHNASWAMY et al.) 02 February 1999, figs. 1C-1D, 3, 10A, 10B, 11, 15, 16, 19A, 19C, 19F, 19G, 21, 30, 31, 52A, 80, 81, col. 1, lines 8-40, col. 11, line 27- col. 12, line 5, col.13, line 18- col. 16, line 64	1-13
A	US 4,958,341 A (HEMMADY et al.) 18 September 1990, abstract.	1-13
A	US 5,608, 786 A (GORDON) 04 March 1997, abstract.	1-13
A	WO 97/28628 (LIN) 07 August 1997, abstract.	1-13

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 11 MARCH 2000	Date of mailing of the international search report 25 APR 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <i>Enrique L. Santiago</i> Enrique L. Santiago Telephone No. (703) 306-5908

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/30845

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	YANG, C. INETPhone: Telephone Services and Servers on Internet, RFC 1789, University of North Texas. April 1995, pages 1-6.	1-13

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty and of the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended ?

The claims only.

The description and the drawings may only be amended during international preliminary examination under Chapter II.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confounded with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF RECEIPT OF
RECORD COPY

(PCT Rule 24.2(a))

From the INTERNATIONAL BUREAU

To:

STUART, Michael, C.
Cohen, Pontani, Lieberman & Pavane
Suite 1210
551 Fifth Avenue
New York, NY 10176
ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year) 06 March 2000 (06.03.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 4925-30PCT	International application No. PCT/US99/30845

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

NOKIA NETWORKS OY (for all designated States except US)

OLKKONEN, Mikko et al (for US)

International filing date : 23 December 1999 (23.12.99)

Priority date(s) claimed : 29 December 1998 (29.12.98)

Date of receipt of the record copy
by the International Bureau : 18 February 2000 (18.02.00)

List of designated Offices :

AP : GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

EP : AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

OA : BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

National : AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW

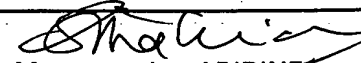
ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase
- ☒ confirmation of precautionary designations
- ☒ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer:  Mougamadou ABIDINE
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated in the Notification of Receipt of Record Copy (Form PCT/IB/301) by paying national fees and furnishing translations, as prescribed by the applicable national laws.

The time limit for performing these procedural acts is **20 MONTHS** from the priority date or, for those designated States which the applicant elects in a demand for international preliminary examination or in a later election, **30 MONTHS** from the priority date, provided that the election is made before the expiration of 19 months from the priority date. Some designated (or elected) Offices have fixed time limits which expire even later than 20 or 30 months from the priority date. In other Offices an extension of time or grace period, in some cases upon payment of an additional fee, is available.

In addition to these procedural acts, the applicant may also have to comply with other special requirements applicable in certain Offices. It is the applicant's responsibility to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most designated Offices do not issue reminders to applicants in connection with the entry into the national phase.

For detailed information about the procedural acts to be performed to enter the national phase before each designated Office, the applicable time limits and possible extensions of time or grace periods, and any other requirements, see the relevant Chapters of Volume II of the PCT Applicant's Guide. Information about the requirements for filing a demand for international preliminary examination is set out in Chapter IX of Volume I of the PCT Applicant's Guide.

GR and ES became bound by PCT Chapter II on 7 September 1996 and 6 September 1997, respectively, and may, therefore, be elected in a demand or a later election filed on or after 7 September 1996 and 6 September 1997, respectively, regardless of the filing date of the international application. (See second paragraph above.)

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

CONFIRMATION OF PRECAUTIONARY DESIGNATIONS

This notification lists only specific designations made under Rule 4.9(a) in the request. It is important to check that these designations are correct. Errors in designations can be corrected where precautionary designations have been made under Rule 4.9(b). The applicant is hereby reminded that any precautionary designations may be confirmed according to Rule 4.9(c) before the expiration of 15 months from the priority date. If it is not confirmed, it will automatically be regarded as withdrawn by the applicant. There will be no reminder and no invitation. Confirmation of a designation consists of the filing of a notice specifying the designated State concerned (with an indication of the kind of protection or treatment desired) and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or international application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before that date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau or if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity to furnish the priority document within a time limit which is reasonable under the circumstances.

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit is the filing date of the earliest application whose priority is claimed.

PATENT COOPERATION TREATY

PCT

INFORMATION CONCERNING ELECTED
OFFICES NOTIFIED OF THEIR ELECTION

(PCT Rule 61.3)

From the INTERNATIONAL BUREAU

To:

STUART, Michael, C.
Cohen, Pontani, Lieberman & Pavane
Suite 1210
551 Fifth Avenue
New York, NY 10176
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 06 September 2000 (06.09.00)		IMPORTANT INFORMATION	
Applicant's or agent's file reference 4925-30PCT			
International application No. PCT/US99/30845	International filing date (day/month/year) 23 December 1999 (23.12.99)	Priority date (day/month/year) 29 December 1998 (29.12.98)	
Applicant NOKIA NETWORKS OY et al			

1. The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:

AP :GH,GM,KE,LS,MW,SD,SL,SZ,TZ,UG,ZW

EP :AT,BE,CH,CY,DE,DK,ES,FI,FR,GB,GR,IE,IT,LU,MC,NL,PT,SE

National :AU,BG,BR,CA,CN,CZ,DE,IL,JP,KP,KR,MN,NO,NZ,PL,RO,RU,SE,SK,US

2. The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:

EA :AM,AZ,BY,KG,KZ,MD,RU,TJ,TM

OA :BF,BJ,CF,CG,CI,CM,GA,GN,GW,ML,MR,NE,SN,TD,TG

National :AE,AL,AM,AT,AZ,BA,BB,BY,CH,CU,DK,EE,ES,FI,GB,GD,GE,GH,GM,HR,HU,
ID,IN,IS,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MD,MG,MK,MW,MX,PT,SD,SG,SI,SL,TJ,
TM,TR,TT,UA,UG,UZ,VN,YU,ZA,ZW

3. The applicant is reminded that he must enter the "national phase" before the expiration of 30 months from the priority date before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary examination report (Article 36(3)(b) and Rule 74.1).

Some offices have fixed time limits expiring later than the above-mentioned time limit. For detailed information about the applicable time limits and the acts to be performed upon entry into the national phase before a particular Office, see Volume II of the PCT Applicant's Guide.

The entry into the European regional phase is postponed until 31 months from the priority date for all States designated for the purposes of obtaining a European patent.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740.14.35	Authorized officer: Olivia TEFY Telephone No. (41-22) 338.83.38
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P03752W00

IPEA/US

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of
International preliminary examination according to the Patent Cooperation Treaty and

Hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examination Authority use only		
Identification of IPEA:		Date of receipt of DEMAND:
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Attorney's Docket No. 4925-30PCT
International application No.: PCT/US99/30845	International filing date (day/month/year): December 23, 1999	(Earliest) Priority date (day/month/year): December 29, 1998
Title of Invention: A Data Transmission Method and a Network Element		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		Telephone No.: 011-358-9-5116-8117
Nokia Networks Oy PL 300 Nokia Group Finland FIN-00045 US		Facsimile No.: 011-358-9-5116-8080
		Teleprinter No.: -
State (that is, country) of nationality: FI		State (that is, country) of residence: FI
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		
OLKKONEN, Mikko Albertinkatu 28 B24 00120 Helsinki, FI		
State (that is, country) of nationality: FI		State (that is, country) of residence: FI
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		
SENGODAN, Senthil 3 Albert Drive, #3 Woburn, MA 01801 US		
State (that is, country) of nationality: US		State (that is, country) of residence: US
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.		

If none of the following sub-boxes is used, this sheet is not to be included in the demand.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

RAJAHALME, Jarno
401 Brookside Dr.
Andover, MA 01810
US

State (*that is, country*) of nationality:
US

State (that is, country) of residence: US

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

SUVANEN, Jyri
Väino Aurin Katu 1 G 24
FIN-00560 Helsinki, FI

State (*that is, country*) of nationality:

State (that is, country) of residence:

FI

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

HAEGGSTRÖM, Johan
Alberganesplanadi 2 A 28
FIN-02600 Espoo, FI

State (*that is, country*) of nationality:
FI

State (that is, country) of residence:

FI

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State (*that is, country*) of nationality:

State (*that is, country*) of residence:

☐ Further applicants are indicated on another continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☐ agent ☐ common representative
and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Lieberman, Lance J.
Cohen, Pontani, Lieberman & Pavane
551 Fifth Avenue, Suite 1210
New York, New York 10176
United States of America

Telephone No.: (212) 687-2770
Facsimile No.: (212) 972-5487

☐ **Address for correspondence:** Mark this box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:
☐ the international application as originally filed
the description ☐ as originally filed
☒ as amended under Article 34
the claims ☐ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☒ as amended under Article 34
the drawings ☐ as originally filed
☒ as amended under Article 34
2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.
3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

- ☒ which is the language in which the international application was filed.
☐ which is the language of a translation furnished for the purposes of international search.
☐ which is the language of publication of the international application.
☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

☒ The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*
excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | |
|---|--------|
| 1. translation of international application: | sheets |
| 2. amendments under Article 34: | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19: | sheets |
| 4. copy (or, where required, translation) of statement under Article 19: | sheets |
| 5. letter: | sheets |
| 6. other (<i>specify</i>): | sheets |

For International Preliminary Examining Authority use only

Received	not received
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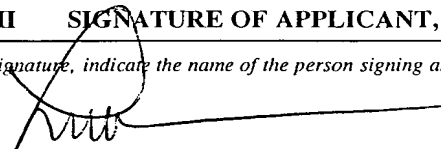
- | | |
|-----|-----|
| [] | [] |
| [] | [] |
| [] | [] |
| [] | [] |
| [] | [] |
| [] | [] |

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate (substitute) signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (<i>specify</i>): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OF COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


Lance J. Lieberman
Cohen, Pontani, Lieberman & Pavane
551 Fifth Avenue, Suite 1210
New York, New York 10176
United States of America

For International Preliminary Examining Authority use only

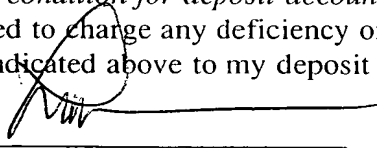
- | | |
|--|---|
| 1. Date of actual receipt of DEMAND: | |
| 2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b): | |
| 3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5 below does not apply. | <input type="checkbox"/> The applicant has been informed accordingly. |
| 4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by the virtue of Rule 80.5. | |
| 5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82. | |

For International Bureau use only

Demand received from IPEA on:

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International Application No.: PCT/US99/30845	For International Preliminary Examining Authority use only	
Attorney's Docket No.: 4925-30PCT	Date stamp of the IPEA	
Applicant: Nokia Networks Oy		
Calculation of prescribed fees		
1. Preliminary examination fee	\$ 490	[P]
2. Handling fee (<i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i>)	\$ 153	[H]
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box.....	\$ 643	
		TOTAL
Mode of Payment		
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash	
<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps	
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons	
<input type="checkbox"/> bank draft	<input type="checkbox"/> other (specify):	
Deposit Account Authorization (<i>this mode of payment may not be available at all IPEAs</i>)		
The IPEA/ <u>US</u> <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.		
<input checked="" type="checkbox"/> (<i>this box may be marked only if the condition for deposit accounts of the IPEA so permit</i>) is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.		
<u>03-2412</u>	<u>24 July 2000</u>	
Deposit Account Number	Date (day/month/year)	Signature

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re International PCT Application of
Nokia Networks Oy et al.
International Appln. No.: PCT/US99/30845
International Filing Date: December 23, 1999
For: A Data Transmission Method and a Network
Element

CERTIFICATE OF EXPRESS MAILING

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX PCT

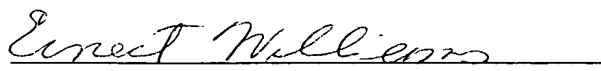
"Express Mail" Mailing Label No.: **EL489906050US**

Date of Deposit: **24 July 2000**

I hereby certify that the following:

- Certificate of Express Mailing No. **EL489906050US**
- PCT Demand
- PCT Fee Calculation Sheet
- Check in the amount of **\$643**
- Return receipt postcard

are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR Section 1.10 on the Date of Deposit indicated above in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231, Box PCT.


Ernest Williams

COHEN, PONTANI, LIEBERMAN & PAVANE
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 01 MAR 2001

PCT

Applicant's or agent's file reference 4925-30PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/30845	International filing date (day/month/year) 23 DECEMBER 1999	Priority date (day/month/year) 29 DECEMBER 1998
International Patent Classification (IPC) or national classification and IPC IPC(7): H04L 12/66 and US Cl.: 370/352		
Applicant NOKIA NETWORKS OY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

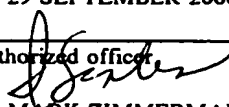
2. This REPORT consists of a total of 4 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24 JULY 2000	Date of completion of this report 29 SEPTEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer  MARK ZIMMERMAN
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0000

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
☒ the description:
pages 1-20, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the claims:
pages 21-22, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the drawings:
pages 1-2, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____
- ☒ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1-13</u>	YES
	Claims <u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claim 1 meets the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a method for transmission of data over a data transmission network employing a network layer protocol from a first network node receiving data from a first circuit switched transmission line to a second network node transmitting data into a second circuit switched transmission line characterized in that the destination address of a network layer protocol datagram comprising data received from the first circuit switched transmission line for transmission to the second network node, is determined from circuit switched channel identifying at least one channel in the second circuit switched transmission line, and the network layer protocol address of the second network node, according to a predefined rule.

Claims 2-9 meet the criteria set out in PCT Article 33(2)-(4), at least for the same reasons discussed above.

Claim 10 meets the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a network element for connection of a circuit switched transmission line to a data transmission network employing a network layer protocol, characterized in that the network element comprises a network layer protocol address generation unit for generating network layer protocol packets based at least partly on parameters identifying at least one channel of the circuit switched transmission line.

Claims 11-13 meet the criteria set out in PCT Article 33(2)-(4), at least for the same reasons discussed above.

----- NEW CITATIONS -----
NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

To: LANCE J. LIEBERMAN COHEN, PONTANI, LIEBERMAN & PAVANE 551 FIFTH AVENUE SUITE 1210 NEW YORK, NY 10176

Date of Mailing <i>(day/month/year)</i>	26 FEB 2001
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Applicant's or agent's file reference 4925-30PCT		IMPORTANT NOTIFICATION
International application No. PCT/US99/30845	International filing date <i>(day/month/year)</i> 23 DECEMBER 1999	Priority Date <i>(day/month/year)</i> 29 DECEMBER 1998
Applicant NOKIA NETWORKS OY		

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer MARK ZIMMERMAN
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0000

P03752600

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4925-30PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/30845	International filing date (day/month/year) 23 DECEMBER 1999	Priority date (day/month/year) 29 DECEMBER 1998
International Patent Classification (IPC) or national classification and IPC IPC(7): H04L 12/66 and US Cl.: 370/352		
Applicant NOKIA NETWORKS OY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

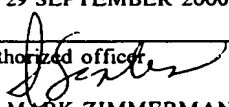
2. This REPORT consists of a total of 4 sheets.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24 JULY 2000	Date of completion of this report 29 SEPTEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer  MARK ZIMMERMAN Telephone No. (703) 308-0000

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

I. Basis of the report

1. With regard to the elements of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages 1-20 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the claims:
pages 21-22 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the drawings:
pages 1-2 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the sequence listing part of the description:
pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. statement**

Novelty (N)

Claims	<u>1-13</u>	YES
Claims	<u>NONE</u>	NO

Inventive Step (IS)

Claims	<u>1-13</u>	YES
Claims	<u>NONE</u>	NO

Industrial Applicability (IA)

Claims	<u>1-13</u>	YES
Claims	<u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claim 1 meets the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a method for transmission of data over a data transmission network employing a network layer protocol from a first network node receiving data from a first circuit switched transmission line to a second network node transmitting data into a second circuit switched transmission line characterized in that the destination address of a network layer protocol datagram comprising data received from the first circuit switched transmission line for transmission to the second network node, is determined from circuit switched channel identifying at least one channel in the second circuit switched transmission line, and the network layer protocol address of the second network node, according to a predefined rule.

Claims 2-9 meet the criteria set out in PCT Article 33(2)-(4), at least for the same reasons discussed above.

Claim 10 meets the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a network element for connection of a circuit switched transmission line to a data transmission network employing a network layer protocol, characterized in that the network element comprises a network layer protocol address generation unit for generation network layer protocol packets based at least partly on parameters identifying at least one channel of the circuit switched transmission line.

Claims 11-13 meet the criteria set out in PCT Article 33(2)-(4), at least for the same reasons discussed above.

----- NEW CITATIONS -----

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/30845

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

PATENT COOPERATION TREATY

From the RECEIVING OFFICE

PCT

To:
MICHAEL C. STUART
COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

INVITATION TO CORRECT DEFECTS IN
THE INTERNATIONAL APPLICATION

(PCT Articles 3(4)(i) and 14(1) and Rule 26)

15 Mar 00

Date of mailing (day/month/year) 15 FEB 00	
Applicant's or agent's file reference 4925-30PCT	REPLY DUE within 1 months / days from the above date of mailing
International application No. PCT/US99/30845	International filing date (day/month/year) 23 DEC 99
Applicant NOKIA NETWORKS OY	

1. The applicant is hereby invited, within the time limit indicated above, to correct the defects in the international application as filed, the defects specified on the attached
- ☒ Annex A
☒ Annex B1 (text matter of the international application as filed)
☒ Annex C1 (drawings of the international application as filed)

2. The applicant is hereby invited, within the time limit indicated above, to correct the defects in the translation of the international application furnished under Rule 12.3, the defects specified on the attached
- ☐ Annex A
☐ Annex B2 (text matter of the translation of the international application)
☐ Annex C2 (drawings of the translation of the international application)

Additional observations (if necessary):

HOW TO CORRECT THE DEFECTS?

Correction must be submitted by filing a replacement sheet embodying the correction and a letter accompanying the replacement sheet, which shall draw attention to the difference between the replaced sheet and the replacement sheet. A correction may be stated in a letter only if it is of such a nature that it can be transferred from the letter to the record copy without adversely affecting the clarity and direct reproducibility of the sheet onto which the correction is to be transferred (Rule 26.4(a)).

ATTENTION

Failure to correct the defects will result in the international application being considered withdrawn by this receiving Office (see Rule 26.5 for further details).

A copy of this invitation and any attachments has been sent to the International Bureau
☒ and the International Searching Authority.

Name and mailing address of the receiving Office
Assistant Commissioner for Patent
Box PCT
Washington, D.C. 20231 Attn: RO/US
Facsimile No. 703-305-3230

Authorized officer

Paul F. Urrutia

Telephone No. 703-305-3681

Form PCT/RO/106 (July 1998)

P03752W00

The receiving Office has found the following defects in the international application as filed:

1. As to signature* of the international application (Rules 1.15 and 90.4), the request:
- a. ☐ is not signed.
 - b. ☐ is not signed by all applicants.
 - c. ☐ is not accompanied by the statement referred to in the check list in Box No. VIII of the request explaining the lack of the signature of an applicant for the designation of the United States of America.
 - d. ☒ is signed by what appears to be an agent/common representative but
 - ☒ the international application is not accompanied by a power of attorney appointing him.
 - ☐ the power of attorney accompanying the international application was not signed by all the applicants.
 - e. ☐ other (specify):

* All applicants must sign, including inventors if they are also applicants (e.g. where the United States of America is designated).

2. As to indications concerning the applicant, the request (Rules 4.4 and 4.5):

- a. ☐ does not properly indicate the applicant's name (specify):
- b. ☐ does not indicate the applicant's address.
- c. ☐ does not properly indicate the applicant's address (specify):
- d. ☐ does not indicate the applicant's nationality.
- e. ☐ does not indicate the applicant's residence.
- f. ☐ other (specify):

3. As to the language of certain elements of the international application, other than the description and claims (Rules 12.1(c) and 26.3ter(a) and (c)):

- a. ☐ the request is not in a language which is both a language accepted by this receiving Office and a language of publication, which is (are):
- b. ☐ the text matter of the drawings is not in the language in which the international application is to be published, which is:
- c. ☐ the abstract is not in the language in which the international application is to be published, which is:

4. The title of the invention:

- a. ☐ is not indicated in Box No. I of the request (Rule 4.1(a)).
- b. ☐ is not indicated at the top of the first sheet of the description (Rule 5.1(a)).
- c. ☐ as appearing in Box No. I of the request is not identical with the title heading the description (Rule 5.1(a)).

5. As to the abstract (Rule 8):

- ☐ the international application does not contain an abstract.

The receiving Office has found that, with regard to the presentation of the text matter of the international application as filed, the physical requirements are not complied with to the extent that compliance therewith is necessary for:

1. ☒ reasonably uniform international publication (Rules 11 and 26.3(a)(i)) (*defects to be specified*):

	Request	Description	Claims	Abstract
a. <input checked="" type="checkbox"/> The sheets do not admit of direct reproduction.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
b. <input type="checkbox"/> The element does not commence on a new sheet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. <input type="checkbox"/> Sheets are not free from creases, cracks, folds.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. <input type="checkbox"/> Sheets are not used in the upright position.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. <input type="checkbox"/> One side of the sheets is not left unused.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. <input type="checkbox"/> The paper of the sheets is not flexible/strong/white/smooth/non-shiny/durable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. <input type="checkbox"/> The sheets are not connected as prescribed (Rule 11.4(b)).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. <input type="checkbox"/> Sheets are not A4 size (29.7cm x 21cm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. <input type="checkbox"/> The minimum margins on the sheets are not as prescribed (top: 2cm; left side: 2.5cm; right side: 2cm; bottom: 2cm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. <input type="checkbox"/> The file reference number indicated on the sheets does not appear in the left-hand corner of the sheets, within 1.5cm of the top of the sheets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. <input type="checkbox"/> The file reference number exceeds the maximum of 12 characters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. <input type="checkbox"/> The sheets of the description, claims and abstract are not numbered in consecutive Arabic numerals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. <input type="checkbox"/> The sheet numbers are not centered at the top or bottom of the sheets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. <input type="checkbox"/> The sheet numbers are in the margin (see i. above for the size of the margins).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. <input checked="" type="checkbox"/> The text matter is not typed or printed clear.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
p. <input type="checkbox"/> The typing on the sheets is not 1.5-spaced.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q. <input type="checkbox"/> The characters in the text matter on the sheets are less than 0.21 cm high in capital letters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r. <input type="checkbox"/> The text matter on the sheets is not in dark, indelible color.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
s. <input type="checkbox"/> The element contains drawings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
t. <input type="checkbox"/> The sheets contain alterations/overwritings/interlineations/too many erasures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
u. <input type="checkbox"/> The sheets contain photocopy marks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. ☒ satisfactory reproduction (Rules 11 and 26.3(b)(i)).

Further observation (if necessary):

The receiving Office has found that, with regard to the presentation of the drawings of the international application as filed, the physical requirements are not complied with to the extent that compliance therewith is necessary for:

1. ☒ reasonably uniform international publication (Rules 11 and 26.3(a)(i)) (defects to be specified):

Sheets containing drawings:

- a. ☐ the sheets do not admit of direct reproduction.
- b. ☐ the sheets are not free from creases, cracks, folds.
- c. ☐ one side of the sheets is not left unused.
- d. ☐ the paper of the sheets is not flexible/strong/white/smooth/non-shiny/durable.
- e. ☐ the drawings do not commence on a new sheet.
- f. ☐ the sheets are not connected as prescribed (Rule 11.4(b)).
- g. ☐ the sheets are not A4 size (29.7cm x 21cm).
- h. ☐ the minimum margins on the sheets are not as prescribed (top: 2.5cm; left side: 2.5cm; right side: 1.5cm; bottom: 1cm).
- i. ☐ the file reference number indicated on the sheets does not appear in the left-hand corner of the sheets, within 1.5cm of the top of the sheets.
- j. ☐ the file reference number exceeds the maximum of 12 characters.
- k. ☐ the sheets are not free from frames around usable or used surfaces.
- l. ☐ the sheets are not numbered in consecutive Arabic numerals (e.g. 1/3, 2/3, 3/3).
- m. ☐ the sheet numbers are not centered at the top or bottom of the sheets.
- n. ☒ the sheet numbers are in the margin (see h. above for the size of the margins).
- o. ☐ the sheets contain alterations/overwritings/interlineations/too many erasures.
- p. ☐ the sheets contain photocopy marks.

Drawings (Rule 11.13):

- a. ☒ do not admit of direct reproduction.
- b. ☐ contain unnecessary text matter.
- c. ☐ contain words so placed as to prevent translation without interference with lines thereof.
- d. ☒ are not executed in durable black color; the lines are not uniformly thick and well-defined.
- e. ☐ contain cross-sections not properly hatched.
- f. ☐ would not be properly distinguishable in reduced reproduction.
- g. ☐ contain scales not represented graphically.
- h. ☐ contain numbers, letters and reference lines lacking simplicity and clarity.
- i. ☐ contain lines drafted without the aid of drafting instruments.
- j. ☐ contain disproportionate elements of a figure not necessary for clarity.
- k. ☐ contain numbers and letters of height less than 0.32 cm.
- l. ☐ contain letters not conforming to the Latin, and where customary, Greek alphabets.
- m. ☐ contain figures on two or more sheets which form a single complete figure but which are not able to be assembled without concealing parts thereof.
- n. ☐ contain figures which are not properly arranged and clearly separated.
- o. ☐ contain different figures not numbered in consecutive Arabic numerals.
- p. ☐ contain different figures not numbered independent of the numbering of the sheets.
- q. ☐ are not restricted to reference signs mentioned in the description.
- r. ☐ do not contain reference signs that are mentioned in the description.
- s. ☐ contain the same feature denoted by different reference signs.
- t. ☐ are not arranged in an upright position, clearly separated from one another.
- u. ☐ are not presented sideways with the top of the figures at the left side of the sheets.

2. ☒ satisfactory reproduction (Rules 11 and 26.3(b)(i)).

Further observations (if necessary):

PATENT COOPERATION TREATY

From the RECEIVING OFFICE

PCT

COMMUNICATION IN CASES FOR WHICH
NO OTHER FORM IS APPLICABLE

To:
MICHAEL C. STUART
COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

Date of mailing (day/month/year)	15 FEB 00
-------------------------------------	-----------

Applicant's or agent's file reference 4925-30PCT	REPLY DUE See paragraph 1 below
---	------------------------------------

International application No. PCT/US99/30845	International filing date (day/month/year) 23 DEC 99
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Applicant NOKIA NETWORKS OY	
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1. ☐ REPLY DUE within _____ months/days from the above date of mailing
- ☐ NO REPLY DUE, however, see below _____
- ☒ IMPORTANT COMMUNICATION
- ☐ INFORMATION ONLY

2. COMMUNICATION:

Under the provisions of PCT Rule 17 the applicant must submit a certified copy of all priority applications to the Receiving Office or to the International Bureau by 16 months from the earliest claimed priority date. The Designated Offices may disregard the priority claim if the certified copy is not timely received.

The priority application was filed in a country other than the United States of America. It is applicant's responsibility to assure that a certified copy is timely received by the Receiving Office or by the International Bureau.

Name and mailing address of the receiving Office Assistant Commissioner for Patent Box PCT Washington, D.C. 20231 Attn: RO/US Facsimile No. 703-305-3230	Authorized officer Paul F. Urrutia Telephone No. 703-305-3681
--	---

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF RECEIPT
OF SEARCH COPY

(PCT Rule 25.1)

To:
MICHAEL C. STUART
COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

Date of mailing (day/month/year)	15 FEB 00
-------------------------------------	-----------

Applicant's or agent's file reference 4925-30PCT	IMPORTANT NOTIFICATION
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International application No. PCT/US99/30845	International filing date (day/month/year) 23 DEC 99	Priority date (day/month/year) 29 DEC 98
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Applicant NOKIA NETWORKS OY	
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1. Where the International Searching Authority and the receiving Office are not the same Office:

The applicant is hereby notified that the search copy of the international application was received by this International Searching Authority on the date indicated below.

Where the International Searching Authority and the receiving Office are the same Office:

The applicant is hereby notified that the search copy of the international application was received on the date indicated below.

15 FEB 00 _____ (date of receipt).

2. ☐ The search copy was accompanied by a diskette containing nucleotide and/or amino acid sequence listings.

3. Time limit for establishment of international search report

The applicant is informed that the time limit for establishing the international search report is 3 months from the date of receipt indicated above or 9 months from the priority date, whichever time limit expires later.

4. A copy of this notification has been sent to the International Bureau and, where the first sentence of paragraph 1 applies, to the receiving Office.

Name and mailing address of the ISA/ Assistant Commissioner for Patent Box PCT Washington, D.C. 20231 Attn: RO/US Facsimile No. 703-305-3230	Authorized officer Paul F. Urrutia Telephone No. 703-305-3681
--	---

TO: MICHAEL C. STUART COHEN, PONTANI, LIEBERMAN & PAVANE 551 FIFTH AVENUE SUITE 1210 NEW YORK, NY 10176	UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) NOTIFICATION OF STATUS OF REQUIREMENTS UNDER 35 U.S.C. 371
	DATE OF MAILING <small>(day/month/year)</small> <div style="text-align: right;">15 FEB 00</div>
	FILE REFERENCE <div style="text-align: right;">4925-30PCT</div>
IDENTIFICATION OF INTERNATIONAL APPLICATION	
International application No. <div style="text-align: center;">PCT/US99/30845</div>	International filing date <small>(day/month/year)</small> <div style="text-align: center;">23 DEC 99</div>
Priority Date Claimed <div style="text-align: right;">29 DEC 98</div>	
Applicant for DO/EO/US <div style="text-align: center;">OLKKONEN, MIKKO</div>	
NOTIFICATION	
<p>The applicant is hereby advised that the U.S. Patent and Trademark Office in its capacity as <input checked="" type="checkbox"/> Designated Office <input type="checkbox"/> Elected Office has received following items as of the date of mailing indicated above.</p> <ol style="list-style-type: none"> 1. <input type="checkbox"/> U.S. Nation fee [35 U.S.C 371 (c) (1)] 2. <input type="checkbox"/> Oath of declaration [35 U.S.C 371 (c) (4)] 3. <input checked="" type="checkbox"/> Copy of International application as [35 U.S.C 371 (c) (2)] 4. <input type="checkbox"/> Translation of Application [35 U.S.C 371 (c) (2)] 5. <input type="checkbox"/> Amendments under PCT Article 19 [35 U.S.C 371 (c) (3)] 6. <input type="checkbox"/> Translation of PCT Article 19 Amendments [35 U.S.C 371 (c) (3)] 7. <input type="checkbox"/> Search Report or Declaration under PCT Article 17(2) [35 U.S.C 371 (a)] 8. <input type="checkbox"/> International Preliminary Examination Report and its Annexes, if any, under PCT Article 36(3)(b) [35 U.S.C 371 (a)] 9. <input type="checkbox"/> Translation of Annexs to the International Preliminary Examination Report under PCT Article 36(3)(b) [35 U.S.C 371 (c) (5)] 10. <input type="checkbox"/> Other items received: <div style="margin-left: 20px;"> <input type="checkbox"/> Assignment Document <input type="checkbox"/> Prior Art Statement <input type="checkbox"/> Preliminary Amendment </div> <p>A. <input type="checkbox"/> Requirements for U.S. National processing have been met. Processing will commence</p> <div style="margin-left: 20px;"> <input type="checkbox"/> at the expiration of the applicable time limit under either <div style="margin-left: 20px;"> <input type="checkbox"/> PCT Article 22 [35 U.S.C 371 (b)] or <input type="checkbox"/> PCT Article 39 [35 U.S.C 371 (b)] </div> <input type="checkbox"/> on the date indicated below under the provisions of 35 U.S.C 371 (f) </div> <div style="margin-top: 20px;"> <div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <u>U.S. NATIONAL SERIAL#</u> </div> <div style="width: 30%;"> <u>DATE UNDER 35 U.S.C. 102(e)</u> </div> <div style="width: 30%;"> <u>DATE OF COMMENCEMENT OF NATIONAL PROCESSING</u> </div> </div> <p><i>All correspondence submitted after the date of commencement of U.S. National processing indicated above should refer to the U.S. National Serial Number and the appropriate U.S. National processing organization of Officer.</i></p> <p>B. <input type="checkbox"/> As the above identified application has been accepted for U.S. National processing under the provision of 35 U.S.C. 371 (f) before expiration of the applicable time limit under <input type="checkbox"/> PCT Article 22 <input type="checkbox"/> PCT Article 39, applicant is reminded that</p> <div style="margin-left: 20px;"> <input type="checkbox"/> Amendments under PCT Article 19 and/or <input type="checkbox"/> the International Preliminary Examination Report and its Annexes, if any, under PCT Article 36(3) (a), and (b) and any translation thereof, if applicable, must be submitted to the Patent and Trademark Office as soon as they are available. </div> </div>	

International application No. PCT/US99/30845	International filing date 23 DEC 99	Priority Date Claimed 29 DEC 98
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C. ☒ In order that U.S. National processing may begin, certain items must be received by the DO/EO/US by the expiration of applicable time limit under

☒ PCT Article 22 or
☒ PCT Article 39.

Specifically:

☒ 1. U.S. National Fee
☒ 2. Oath or Declaration
☐ 3. Copy of Application
☐ 4. Translation of application
☒ 5. Amendments under PCT Article 19, if any
☐ 6. Translation of PCT Article 19 Amendments, if applicable
☐ 7. Search Report or PCT Article 17(2) declaration
☐ 8. International Preliminary Examination Report and its Annexes, if any, under PCT Article 36(3)(a), if applicable
☐ 9. Translation of Annexes to the International Preliminary Examination Report under PCT Article 36(3)(b), if applicable

THE ABOVE CHECK ITEMS MUST BE TIMELY RECEIVED TO AVOID ABANDONMENT OF THE APPLICATION.
[35. U.S.C. 371(d)]

D. Further information for the applicant:

This is only a reminder.

UNITED STATES DESIGNATED/ELECTED OFFICE	
Address Only: Assistant Commissioner for Patent Box PCT Washington, D.C. 20231 Attn: RO/US	Authorized Office Paul F. Urrutia

PCT INTERNATIONAL APPLICATION TRANSMITTAL LETTER	DATE: 23 December 1999
REGARDING THE INTERNATIONAL APPLICATION OF: Nokia Networks Oy	DOCKET OR REFERENCE NO.: PCTAUS 9973084 4925-30PCT 301 Rec'd PCT/PTO 23 DEC 1999
ENTITLED: A Data Transmission Method and a Network Element	

Certification under 37 CFR 1.10 (if applicable)

EL279087390US

Express Mail[®] mailing number

23 December 1999

Date of Deposit

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Ernest Williams

(Typed or printed name of person mailing application)

Ernest Williams
(Signature of person mailing application)

To the United States Receiving Office (RO/US):

Accompanying this transmittal letter is the above-identified International application, including a completed Request form (PCT/RO/101). Please process the application according to the provisions of the Patent Cooperation Treaty.

The following requests are made of the RO/US:

1. ☐ PREPARATION AND TRANSMITTAL OF CERTIFIED COPY OF PRIORITY DOCUMENTS - Please prepare and transmit to the International Bureau a certified copy of the United States origin priority documents identified in Box VI of the Request form (37 CFR 1.451).

To cover the cost of copy preparation and certification (37 CFR 1.19(a)(3) and (b)(1)),

☐ a check in the amount of is attached to this transmittal letter.

☐ the RO/US is hereby authorized to charge the following deposit account no.: 03-2412.

The appropriate Search fee for the above-named Authority is indicated on the Fee Calculation Sheet (PCT/RO/101 Annex).

2. ☒ SUPPLEMENTAL SEARCH FEES (ONLY WHEN ISA/US CONDUCTS THE INTERNATIONAL SEARCH.) - Please charge any Supplemental Search fees that may be required by the United States International Searching Authority (ISA/US) to deposit account no. 03-2412.

I understand that this authorization is subject to my oral confirmation thereof in each instance and that it in no way limits my right to submit a protest against payment of the Supplemental Search fees, but is merely an administrative aid to assure that the ISA/US may timely complete the Search Report.

NOTE: SUPPLEMENTAL SEARCH FEES FOR ISA/EP ARE PAYABLE DIRECTLY TO THE EUROPEAN PATENT OFFICE

3. ☒ DISCLOSURE INFORMATION - In order to assist in screening the accompanying International application for purposes of determining whether a license for foreign transmittal should and could be granted, the following information is supplied:
- A. ☐ There is no prior filed application relating to this invention.
- B. ☒ There is a prior application*, serial number FI 982811 filed on 29 December 1998 which contains subject matter that is
1. ☒ substantially identical to that of the accompanying International application.
2. ☐ less than that of the accompanying International application. The additional subject matter of the International application appears on page(s) and line(s)
3. ☐ more than that of the accompanying International application.
- C. ☐ Disclosure information cannot be covered by the language of Points 3A and 3B above due to the involvement of several prior applications or for other reasons. A separate sheet on which the disclosure information is explained is attached to this transmittal letter.
4. ☒ REQUEST FOR FOREIGN TRANSMITTAL LICENSE - According to the provisions of 35 U.S.C. 184 and 37 CFR 5.11, a license to transmit the accompanying International application to foreign agencies or international authorities is hereby requested.

* Priority is not claimed, unless all necessary information is listed in Box VI of the Request Form (PCT/RO/101).

Signer is the
☐ Applicant
☐ Common Representative
☒ Attorney

Name of Signer:

Lance J. Lieberman

Signature LJL

PATENT COOPERATION TREATY

From the RECEIVING OFFICE

PCT

NOTIFICATION CONCERNING PAYMENT OF PRESCRIBED FEES

(PCT Rules 14, 15 and 16 and Administrative
Instructions, Sections 304(a) and (b) and 323(b))

To: MICHAEL C. STUART COHEN, PONTANI, LIEBERMAN & PAVANE 551 FIFTH AVENUE SUITE 1210 NEW YORK, NY 10176			Date of mailing <i>(day/month/year)</i>	15 FEB 00
Applicant's or agent's file reference <p style="text-align: center;">4925-30PCT</p>			PAYMENT DUE <p style="text-align: center;">see item 3 for time limits</p>	
International application No. <p style="text-align: center;">PCT/US99/30845</p>	International filing date/Date of receipt <i>(day/month/year)</i> <p style="text-align: center;">23 DEC 99</p>	Priority date <i>(day/month/year)</i> <p style="text-align: center;">29 DEC 98</p>		
Applicant NOKIA NETWORKS OY				

1. The applicant is hereby notified that this receiving Office has received:

- ☒ the payment of all the prescribed fees, and
 ☐ an overpayment, which will be refunded in due course.
☐ no or insufficient payment of the prescribed fees and the applicant is hereby invited to pay the balance due, as summarized under item 2, within the time limit(s) indicated under item 3.

2. Fees and payment calculation:

2,445.00	-	2,445.00	=	0.00
Total fees payable		Amount paid		Balance

- ☒ The details of the calculation are given in the Annex.

3. Time limit(s) for payment and amount(s) payable (Rules 14.1, 15.4 and 16.1(f)):

- ☐ within ONE MONTH from the date of receipt of the international application (for the transmittal fee (if any), the search fee, the basic fee and the designation fee). The amount payable for each fee is the amount applicable on the date of receipt of the international application.
☐ within ONE YEAR from the priority date (only for the designation fee and only if this time limit expires later than the above time limit).
 — If the designation fee is paid within one month from the date of receipt of the international application, the amount payable is the amount applicable on that date of receipt.
 — If the designation fee is paid within one year from the priority date but later than one month from the date of receipt of the international application, the amount payable is the amount applicable on the date of payment. The receiving Office should be consulted for the applicable amount.
☐ within 16 MONTHS from the priority date (only for the fee for priority document). The applicant's attention is drawn to the fact that the request made by the applicant under Rule 17.1(b) will be considered not to have been made unless the fee is paid within that time limit.

4. Additional observations (if necessary):

- ☐ The search copy will not be transmitted to the International Searching Authority until the search fee is paid (therefore the start of the international search will be delayed) (Rule 23.1(a) and (b)).

Name and mailing address of the receiving Office Assistant Commissioner for Patent Box PCT Washington, D.C. 20231 Attn:RO/US Facsimile No. 703-305-3230	Authorized officer Paul F. Urrutia Telephone No. 703-305-3681
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Form PCT/RO/102 (January 1999; reprint January 2000)

COHEN, PONTANI, LIEBERMAN & PAVANE

FEB 18 2000

RECEIVED

**ANNEX TO FORM PCT/RO/102
CALCULATION OF THE PRESCRIBED FEES**

International application No.
PCT/US99/30845

T Transmittal Fee

Prescribed amount: 240.00 **T**
 Amount paid: 240.00
 Balance: 0.00

☒ correct amount
☐ overpayment
☐ balance due

S Search Fee

Prescribed amount: 700.00 **S**
 Amount paid: 700.00
 Balance: 0.00

☒ correct amount
☐ overpayment
☐ balance due

I International Fee

B Basic Fee

Fixed amount for first 30 sheets: 455.00 **b1**
 Amount per additional sheet: 10.00
 Number of additional sheets: x 0 = 0.00 **b2**
 Prescribed amount (b1 + b2) = 455.00 **B**

D Designation Fee

Amount of designation fee: 105.00
 Number of designation fees payable (maximum 8): x 10
 Prescribed amount = 1,050.00 **D**

R Reduction where PCT-EASY software is used
(See the PCT Applicant's Guide, Volume I, General Part, for details on the availability of this reduction):

0.00 **R**

Sub-total (B+D-R): 1,505.00 **B+D-R**

Prescribed total amount *(The amount to be entered at I is the sub-total entered at (B+D-R), except where the applicant is (or all applicants are) entitled to a reduction of 75%, in which case the amount to be entered at I is 25% of the sub-total (B+D-R); certain applicants from certain States are entitled to a reduction of 75% of the international fee; see Notes to the Fee Calculation Sheet as annexed to the Request Form, PCT/RO/101, for details):*

1,505.00 **I**

Amount paid: 1,505.00
 Balance: 0.00

☒ correct amount
☐ overpayment
☐ balance due

P Fee for priority document

Prescribed amount: 0.00 **P**
 Amount paid: 0.00
 Balance: 0.00

☐ correct amount
☐ overpayment
☐ balance due

Additional observations *(if necessary)*

- ☐ The amount paid for the designation fee covers the following designations: _____
- ☐ Other *(specify)*: _____

PATENT COOPERATION TREATY

From the RECEIVING OFFICE

PCT

NOTIFICATION OF THE INTERNATIONAL APPLICATION NUMBER AND OF THE INTERNATIONAL FILING DATE

(PCT Rule 20.5(c))

To:
MICHAEL C. STUART
COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

Date of mailing
(day/month/year) **15 FEB 00**

Applicant's or agent's file reference
4925-30PCT

IMPORTANT NOTIFICATION

International application No.
PCT/US99/30845

International filing date (day/month/year)
23 DEC 99

Priority date (day/month/year)
29 DEC 98

Applicant
NOKIA NETWORKS OY

Title of the invention
A DATA TRANSMISSION METHOD AND A NETWORK ELEMENT

1. The applicant is hereby notified that the international application has been accorded the international application number and the international filing date indicated above.

2. The applicant is further notified that the record copy of the international application:

- ☒ was transmitted to the International Bureau on **15 FEB 00**
- ☐ has not yet been transmitted to the International Bureau for the reason indicated below and a copy of this notification has been sent to the International Bureau*:
- ☐ because the necessary national security clearance has not yet been obtained.
- ☐ because (reason to be specified):

* The International Bureau monitors the transmittal of the record copy by the receiving Office and will notify the applicant (with Form PCT/IB/301) of its receipt. Should the record copy not have been received by the expiration of 14 months from the priority date, the International Bureau will notify the applicant (Rule 22.1(c)).

3. FOREIGN TRANSMITTAL LICENSE INFORMATION

Completed by: **L & R**

- ☐ Additional license for foreign transmittal not required. This subject matter is covered by a license already granted or the equivalent U.S. national application. Refer to that license for information concerning its scope.
- ☐ License for foreign transmittal not required. 37 CFR 5.11(e)(1) or 37 CFR 5.11(e)(2). However, a license may be required for additional subject matter. See 37 CFR 5.15(b).
- ☒ Foreign transmittal license granted. 35 U.S.C. 184; 37 CFR 5.11 on **19JAN2000** :
(date)
- ☒ 37 CFR 5.15(a) ☐ 37 CFR 5.15(b)

Name and mailing address of the receiving Office
Assistant Commissioner for Patent
Box PCT
Washington, D.C. 20231 Attn: RO/US
Facsimile No. 703-305-3230

Authorized officer
Paul F. Urutia

Telephone No. 703-305-3681

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty

For receiving Office use only

International Application No.

International Filing Date

Name of receiving office and "PCT International Application"

Applicant's or agent's file reference: 4925-30PCT

Box No. I	TITLE OF THE INVENTION A Data Transmission Method and a Network Element			
Box No. II	APPLICANT			
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) Nokia Networks Oy PL 300 Nokia Group, FI, FIN-00045		<input type="checkbox"/> This person is also inventor		
		Telephone No. 011-358-9-5116-8117		
		Facsimile No. 011-358-9-5116-8080		
		Teleprinter No.		
State (that is, country) of nationality: FI		State (that is, country) of residence: FI		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box				
Box No. III	FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)			
Name and address (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) OLKKONEN, Mikko Albertinkatu 28 B24 00120 Helsinki, FI		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this box is marked, do not fill in below.)		
State (that is, country) of nationality: FI		State (that is, country) of residence: FI		
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box				
<input checked="" type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet				
Box No. IV	AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE			
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:		<input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Stuart, Michael C. Cohen, Pontani, Lieberman & Pavane 551 Fifth Avenue, Suite 1210 New York, New York 10176, US		Telephone No. (212) 687-2770		
		Facsimile No. (212) 972-5487		
		Teleprinter No.		
<input type="checkbox"/> Address for correspondence: Mark this box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.				

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS	
<i>If none of the following sub-boxes is used, this sheet is not to be included in the request.</i>	
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See Notes to the request form

sheet is not part of and does not count as a sheet of the international application.

**PCT
FEE CALCULATION SHEET
Annex to the Request**

For receiving Office use only

International application No.

Attorney Docket No.: **4925-30PCT**

Date stamp of the receiving Office

Applicant: **Nokia Networks Oy**

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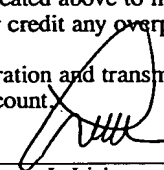
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03-2412
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Lance J. Lieberman
Reg. No. 28,437

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

STUART, Michael, C.
Cohen, Pontani, Lieberman & Pavane
Suite 1210
551 Fifth Avenue
New York, NY 10176
ETATS-UNIS D'AMERIQUE

2000

Date of mailing (day/month/year) 06 July 2000 (06.07.00)		IMPORTANT NOTICE	
Applicant's or agent's file reference 4925-30PCT			
International application No. PCT/US99/30845	International filing date (day/month/year) 23 December 1999 (23.12.99)	Priority date (day/month/year) 29 December 1998 (29.12.98)	
Applicant NOKIA NETWORKS OY et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AU,CN,JP,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

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The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).
3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 06 July 2000 (06.07.00) under No. WO 00/39970

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

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For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. (41-22) 740.14.35</p>	<p>Authorized officer J. Zahra</p> <p>Telephone No. (41-22) 338.83.38</p>
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P03752400

PCT COOPERATION TREATY

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PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

STUART, Michael, C.
Cohen, Pontani, Lieberman & Pavane
Suite 1210
551 Fifth Avenue
New York, NY 10176
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 02 November 2000 (02.11.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 4925-30PCT	
International application No. PCT/US99/30845	International filing date (day/month/year) 23 December 1999 (23.12.99)

1. The following indications appeared on record concerning:

☒ the applicant ☒ the inventor ☐ the agent ☐ the common representative

Name and Address

COHEN, PONTANI, LIEBERMAN & PAVANE

NOV 15 2000

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State of Residence

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2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

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Name and Address

SUVANEN, Jyri
Väino Aurin Katu 1 G 24
FIN-00560 Helsinki
FinlandHAEGGSTRÖM, Johan
Alberganesplanadi 2 A 28
FIN-02600 Espoo
Finland

State of Nationality

FI

State of Residence

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04L 12/66		A1	(11) International Publication Number: WO 00/39970
			(43) International Publication Date: 6 July 2000 (06.07.00)
<p>(21) International Application Number: PCT/US99/30845</p> <p>(22) International Filing Date: 23 December 1999 (23.12.99)</p> <p>(30) Priority Data: 982811 29 December 1998 (29.12.98) FI</p> <p>(71) Applicant (for all designated States except (US)): NOKIA NETWORKS OY [FI/FI]; PI 300, FIN-00045 Nokia Group (FI).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): OLKKONEN, Mikko [FI/FI]; Albertinkatu 28 B24, FIN-00120 Helsinki (FI). ✓ SENGODAN, Senthil [US/US]; 3 Albert Drive, #3, Woburn, MA 01801 (US). WAJAHALME, Jarno [US/US]; 401 Brookside Drive, Andover, MA 01810 (US).</p> <p>(74) Agent: STUART, Michael, C.; Cohen, Pontani, Lieberman & Pavane, Suite 1210, 551 Fifth Avenue, New York, NY 10176 (US).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>	
(54) Title: A DATA TRANSMISSION METHOD AND A NETWORK ELEMENT ✓			
(57) Abstract			
<p>The invention is concerned with transmission of speech information over mixed networks, particularly over a segment using packet transmission in an otherwise circuit switched data transmission network. According to the invention, PCM transmission lines are connected with a packet based network such as an IP network in such a way, that data from one or more channels of a first PCM transmission line is collected in the payload part of a data packet. Further, the destination address of the data packet is constructed in such a way, that the packet network entity being connected to the second PCM transmission line can determine based on the destination address of the packet, to which channel or channels of the second PCM transmission line the data should be transmitted.</p>			

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A data transmission method and a network element

TECHNICAL FIELD OF THE INVENTION

5 The invention is concerned with transmission of speech information over mixed networks, particularly over a segment using packet transmission in an otherwise circuit switched data transmission network. The invention is directed to a method according to the preamble of claim 1.

BACKGROUND OF THE INVENTION

10 In conventional telephony, a basic channel format is the 64 kbit/s channel, in which a single speech connection is transmitted. The 64 kbit/s channel transmits 8000
15 samples per seconds, each sample having 8 bits. Typically, a plurality of 64 kbit/s channels are transmitted in a single transmission line to form 1544 kbit/s, 2048 kbit/s, and higher transmission rates. In a 2048 kbit/s transmission link, a 256 bit i.e. 32 byte frame is transmitted 8000 times per second. The 32 groups of 8 bits, i.e. bytes of the frame are referred to as time slots. The terms PCM transmission line and
20 trunk line are commonly used to refer to a communication link transmitting a plurality of 64 kbit/s channels. Therefore, to identify a certain speech channel transmitted within a group of trunk lines, one needs to indicate the time slot number of the channel and a trunk line identifier. The term trunk line is sometimes used also to denote a basic 1544 kbit/s or 2048 kbit/s unit of transmission even in a case,
25 when a plurality of such transmission units are transmitted in a single physical transmission medium i.e. in a single physical transmission line. Although the acronym PCM strictly considered denotes pulse code modulation, which is typically used in trunk lines, the term PCM transmission line is generally used by a person skilled in the art and specifically in this specification to refer to aforementioned
30 logical group of channels or a group of groups of channels and not to a specific modulation method.

Further, packet based transmission networks are presently in widespread use, a prominent example being the Internet. A common packet transmission protocol is
35 the Internet Protocol (IP). The IP protocol version 4 is described in detail in the specification RFC 791. The next version of the IP protocol, known as IPv6, is described in the specification RFC 1883.

The increasing importance and use of telecommunication drives toward interconnection of different types of networks. For example, the Internet is already used for transmitting voice using so called internet telephony. As the data transmission capacity of the Internet increases, the use of Internet as a replacement
5 of conventional telephones will become common. Some telephone operators already provide long distance calls via the Internet with a reduced rate.

Different schemes for interconnecting cellular telecommunication networks with the Internet are presently under development. The complicity of cellular
10 telecommunication networks and the wide variety of services they provide create new and extensive fields of problems in the interconnection of different networks. One example of a feature unique to cellular telecommunication networks is the compression of speech, which is needed due to limitations of the capacity of the radio interface. A mobile station codes the speech of the user using one of the
15 available codecs, and transmits the resulting coded speech parameters over the radio interface to the base station of the cellular network. The coded speech parameters are decoded back to a speech signal in the cellular network. However, typical compression methods used do not transmit all data in the speech signal, since the compression methods take advantage of the fact, that speech perception of a typical
20 listener is very sensitive to certain features of a speech signal, while being less sensitive, even insensitive to some other features. Therefore, typical compression methods leave out those parts of a speech signal, which are not important to the perceived quality of transmitted speech. However, when coding and decoding is performed more than once, such as in a mobile-to-mobile connection in a cellular
25 telecommunication network, speech quality may be drastically reduced due to the double coding and decoding. This problem can be avoided for example by using the so called tandem free operation (TFO) mode of transmission. In TFO mode, the cellular network element performing the decoding of the coded speech parameters received from the mobile station, inserts the original received coded speech
30 parameteres into the decoded speech signal which is forwarded to the receiver. The speech parameters are typically inserted into the least significant bits of the speech samples of the speech signal, whereby they are perceived as a slight increase of background noise by a receiver of the speech signal, if the receiver does not utilize the embedded speech parameters. In case of a mobile to mobile TFO mode call, the
35 network element at the receiving end performing the encoding of the speech signal for transmission to the receiving mobile station extracts the embedded speech parameters, and transmits those to the mobile station without performing a second coding operation. The receiving mobile station then decodes the speech parameters

into a speech signal. In the TFO mode, a speech signal is coded only once, i.e. in the transmitting mobile station, and the receiving mobile station receives the coded speech parameters prepared by the transmitting mobile station, whereby double coding is avoided. This significantly improves the speech quality because without
5 TFO, the original speech signal is coded twice with the lossy speech compression algorithm which degrades the speech quality each time the compression is applied. The difference between the single encoding and the tandem encoding becomes even more important when the bit-rate of a speech codec is very low. The old high bit-rate speech coding standards, as exemplified by the G.711 standard of 64 kbit/s
10 PCM coding, are very robust to successive coding. However, the state of the art speech coders operating in a range of 4 kbit/s to 16 kbit/s are quite sensitive to more than one successive coding.

A number of problems arises when different types of transmission networks
15 participate in transmission of connections, especially when different connections have different parameters such as the data transmission rate and whether compression is used or not. One problem, for example, is how to optimize the data transmission in the case, when some of the data transmission channels are compressed and some transmission channels are not compressed. A further problem
20 is how to efficiently connect PCM transmission lines with an packet based network such as an IP network.

SUMMARY OF THE INVENTION

25 An object of the invention is to realize a transmission method, which allows the use of packet based networks in transmission of circuit switched connections. An object of the invention is also to provide a way for connecting two PCM transmission lines with a packet based network such as an IP or an X.25 network. A further object of the invention is to provide such a method, which allows the transmission of both
30 compressed and noncompressed traffic. A still further object of the invention is to provide such a method, which optimizes the use of data transmission capacity for both compressed and noncompressed traffic.

35 The objects are reached by inserting a number of samples from at least one channel of a PCM transmission line into the payload part of a data packet, and indicating the destination PCM transmission line and the channel within the transmission line in the destination packet address.

The method according to the invention is characterized by that, which is specified in the characterizing part of the independent method claim. The network element according to the invention is characterized by that, which is specified in the characterizing part of the independent claim directed to a network element. The dependent claims describe further advantageous embodiments of the invention.

According to the invention, PCM transmission lines are connected with a packet based network such as an IP or an X.25 network in such a way, that data from one or more channels of a first PCM transmission line is collected in the payload part of a data packet. Further, the destination address of the data packet is constructed in such a way, that the packet network entity being connected to the second PCM transmission line can determine based on the destination address of the packet, to which channel or channels of the second PCM transmission line the data should be transmitted.

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BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in more detail in the following with reference to the accompanying drawings, of which

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Figure 1 describes a method according to an advantageous embodiment of the invention,

Figure 2 illustrates a network element according to an advantageous embodiment of the invention,

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Figure 3 illustrates a further advantageous embodiment of the invention,

Figure 4 illustrates a still further advantageous embodiment of the invention, and

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Figure 5 illustrates a method according to an advantageous embodiment of the invention.

Same reference numerals are used for similar entities in the figures.

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DETAILED DESCRIPTION

A. AN EXAMPLE OF TRANSMISSION OF A TFO MODE CHANNEL

In one advantageous embodiment of the invention, the processing is performed by a network element connected to one or more PCM data transmission lines and a IP network. Such a network element is hereafter referred to as a packet network gateway. The packet network gateway receives 64 kbit/s data transmission channels from the PCM data transmission lines. Each of these 64 kbit/s channels may transmit for example speech or a data or a fax transmission. The PCM transmission line is connected to a network element of a cellular telecommunications network, such as a MSC (mobile services switching center) of a GSM or a UMTS network. In this example, the processing of a TFO mode call is described. In a TFO mode call, the 64 kbit/s speech signal comprises in addition to the speech signal itself, the compressed speech information in the least significant bits of the speech signal. In this example, the packet network gateway extracts the compressed speech information from the incoming signal. The packet network gateway collects a predetermined amount of this compressed speech information, for example a certain amount of bits corresponding to an amount of bytes, which amount of bytes is large enough for efficient transmission and small enough for not producing a too large packetizing delay. When the predetermined amount of speech parameter information is collected, the information is inserted in an IP packet, which is given a destination address corresponding to the packet network gateway associated with the destination MSC. The packet is then transmitted through the IP network to the destination packet network gateway.

The destination packet network gateway then receives the packet and extracts the speech parameter information from the packet. Next, the destination packet network gateway creates a speech signal according to the speech parameter information, and embeds the speech parameter information in the lowermost bits of the speech signal as in conventional TFO mode. The resulting signal is then sent to a 64 kbit/s PCM channel towards the destination MSC.

B. CHANNEL IDENTIFICATION INFORMATION

In an advantageous embodiment of the invention, the channel information identifying the PCM channel at the receiving end is included in the packets of the packet network such as an IP or a X.25 network. In the following, an example of an embodiment of the invention as applied in an IP network is described. The channel identification information may for example be defined by the destination IP address,

or be included in the IP datagram in an extra option field or in the data part of the datagram.

In such an embodiment, in which the destination IP address defines the channel identification information, a predefined rule may be used for generating the IP address and deducing the channel identification information from the IP address. For example, the 64 kbit/s channels in the PCM transmission line connected to the destination packet network gateway may be numbered consecutively, in which case the IP address of a channel can be found by adding the number of the channel to the base address of the packet network gateway. This is only one example of a rule, and does not limit the invention in any way, since many other types of rules may be used in various embodiments of the invention. For example, the time slot numbers of the channels may be used as well. If the packet network gateway is connected to more than one 2048 kbit/s PCM trunk line, the trunk lines may be numbered consecutively, in which case the IP number may be derived from both the time slot number and the trunk line number. For example, the following equation may be used:

$$\text{IP address} = \text{base address} + (N_{TS} \cdot \text{trunk line number}) + \text{time slot number}$$

The term N_{TS} denotes the number of time slots in one frame of the trunk line.

A 1544 kbit/s PCM trunk line has 24 time slots, whereas a 2048 kbit/s PCM trunk line has 32 time slots. For example, if a packet network gateway has as its base address 1.313.42.100, the IP addresses of 32 time slots of a first 2048 kbit/s trunk line would then be 1.313.42.100 to 1.313.42.131 and addresses of the time slots of a second 2048 kbit/s trunk line would then be 1.313.42.132 to 1.313.42.163, assuming that the numbering of time slots and trunk lines starts with zero. The opposite procedure, i.e. computing the trunk line number and the time slot number, can be done for example according to the following equations:

$$\begin{aligned} \text{time slot number} &= (\text{IP address} - \text{base address}) \text{ MOD } N_{TS} \\ \text{trunk line number} &= \text{INT} ((\text{IP address} - \text{base address}) / N_{TS}) \end{aligned}$$

where the function $m \text{ MOD } n$ is the modulo function, and the function $\text{INT}(x)$ returns the integral part of x . The man skilled in the art knows many other straightforward ways how to proceed in the opposite way, i.e. how to compute the

time slot number and the trunk line number from the IP address, when the base address is known. Therefore, these ways are not described here in further detail.

5 The invention is not limited to the previous example of forming the IP address corresponding to a channel, since many other IP address forming rules can be used. For example, in a further advantageous embodiment of the invention, the IP address is formed by concatenating the time slot number to a prefix value associated with the packet network gateway.

10 The previous addressing examples require that the necessary address space, i.e. one IP number per channel is available. In an IPv6 network this should not be a problem. On the other hand, an IPv4 network might not have enough free addresses. In such an embodiment it is desirable, that the channel identification information is specified in some other way than through the IP address. As previously mentioned,
15 the channel identification information may also be encoded in an extra options field in the header of the IP datagram, or preferably, in a predefined way in the data part of the IP datagram.

In a further advantageous embodiment of the invention, the channel identification
20 information at the sending packet network gateway is included in the IP datagram. The channel identification information can be specified in the form of an IP address for example according to previous examples, which address is used as the sender's IP address in the IP datagram. The channel identification information may also be encoded in an extra options field or in the data part of the IP datagram in a
25 predefined way.

C. COMBINING OF MULTIPLE CHANNELS

30 In further advantageous embodiments of the invention, speech data from more than one channel is transmitted in one datagram of the network level protocol such as the IP or the X.25 protocol. One datagram may contain data for example from a plurality of consecutive time slots, or from a plurality of at least partly non-consecutive time slots. Some examples of such embodiments are presented in the following paragraphs.

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C.1 Consecutive channels

In an advantageous embodiment of the invention, data from all time slots of one or more consecutive frames are sent in one datagram of the network level protocol such as the IP or the X.25 protocol. For example, a frame of a 2048 kbit/s PCM line contains 32 time slots. Since each time slot contains 8 bits, one frame corresponds to 32 bytes of payload in an IP datagram, if no compression is used. For example, if 32 consecutive frames are sent in one IP datagram, the IP datagram would have 1024 bytes of uncompressed speech data. However, packing of 32 consecutive frames i.e. 32 samples from each of 32 channels introduces a 4 ms packetizing delay. To obtain shorter delays, frames can be collected from more than one PCM trunk lines. For example, collecting 16 consecutive frames from each of two 2048 kbit/s PCM lines i.e. 16 samples from each of 64 channels, would result in the same amount of data, but only in a 2 ms delay.

In a further advantageous embodiment of the invention, one or more of the plurality of consecutive channels can be transmitted in compressed form. This can be realized for example by adding status information of the transmitted channels to the IP packet. The status information can for example comprise four bits per channel. One of these bits can denote the active/inactive status of the channel, and three of these bits can indicate the number of bits used for transmission of the particular sample of the channel. For example, if a channel is transmitted uncompressed, the sample length would be 8 bits. If a channel transfers compressed speech parameters, three bits may be enough to represent a sample of the compressed speech signal, depending on the compression method used. If the channel is inactive, no bits need to be used to transmit that channel. In the example of 16 samples from 64 channels being packed in one IP datagram, 64 times 4 bits i.e. 32 bytes of status information needs to be inserted in the datagram. This embodiment has the advantage, that while the capacity savings brought about by compressed traffic can be obtained, uncompressed and mixed traffic can be transmitted using the same mechanism. Preferably, the destination IP address and the sender IP address are used to indicate the PCM trunk line or lines, whose data is carried by the datagram. The position of each sample in the datagram specifies the time slot i.e. channel corresponding to the sample.

Preferably, information about the number of channels transferred by an IP datagrams is included in the datagram, for example in the beginning of the channel status information header described in the previous paragraph.

C.2 Nonconsecutive channels

A further advantageous embodiment of the invention provides for transmission of data from nonconsecutive time slots in a single datagram. Such an embodiment can be realized by inserting status information into the datagram, which status information in this embodiment can comprise for example five bits for each time slot: one bit indicating whether the channel is active or inactive, three bits indicating the length of the samples of the channel, and one bit indicating whether channel information is defined by the datagram or not. Thereby the header can indicate separately for each time slot, whether the datagram carries the corresponding channel or not. If the datagram does not carry the corresponding channel, the receiving packet network gateway can receive data to that channel from other sources from the IP network. This embodiment allows the transmission of any number of time slots from one frame, regardless of whether they are consecutive or not. This embodiment has the advantage, that different time slots of a single PCM trunk line can receive data from different packet network gateways. For example, a first packet network gateway may send data to time slots 5 to 10 of a 2048 kbit/s PCM trunk line at a second packet network gateway, while a third packet network gateway may send data to the rest of the time slots of the same PCM trunk line. Further, this embodiment allows the destination packet network gateway to receive a group of channels from another packet network gateway, and single channels separately from one or more other sources, such as IP telephones.

C.3 IP address determination in case of multiple channels

The IP address determination can be performed in roughly similar way as in the case of a single channel being transferred in an IP datagram. The IP address may be advantageously determined based on the time slot number of the first time slot, whose data is transferred in the datagram, and the time slot for each of the rest of the data samples in the datagram is specified by its position relative to the first time slot.

D. SELECTION OF CODING MODE

In some advantageous embodiments of the invention, the packet network gateway does not perform any coding mode negotiations with other network elements. In such embodiments, the packet network gateway transparently transfers uncompressed channels, and transmits through the packet network only the compressed speech parameters for any TFO mode signals present. However, in other embodiments of the invention, the packet network gateway can take part in

coding mode negotiations between various network elements, and two packet network gateways can negotiate about compression modes to be used between them. Such functionality brings considerable advantages for example when different types of communication networks are connected using a packet network. Some exemplary
5 embodiments of the invention, in which packet network gateways perform or participate in coding mode decisions and negotiations are described in the following paragraphs.

10 In one advantageous embodiment, a first packet network gateway is connected to a cellular telecommunications network such as a GSM network or an UMTS network, and a second packet network gateway is connected to a conventional telephone system. In such a case, the first and second packet network gateways can negotiate to select the same coding mode for a connection, which is used by the mobile station of the cellular telecommunications network. Consequently, the connection can be
15 treated by the cellular telecommunications network as a TFO connection. The first packet network gateway simply transmits the compressed speech parameters to the second packet network gateway as described previously, and the second packet network gateway compresses the speech signal from the conventional telephone network, before transmission of the compressed signal to the first packet network
20 gateway and the cellular telecommunications network. Further, in this case the second packet network gateway does not need to embed the compressed speech parameters in the decompressed speech signal sent to the conventional telephone network, since most likely the compressed speech parameters would not be used in any way in the conventional telephone network.

25 In a further advantageous embodiment of the invention, an packet network gateway can in addition to coding implement other conventional features used typically in cellular telecommunication systems to reduce data transmission, such as discontinuous transmission. In such an embodiment, a voice activity detector of the
30 packet network gateway monitors the transmitted speech signal, and if no voice activity is detected, no data is transmitted over the packet network. Preferably, silence descriptor information is transmitted before a transmission pause, in order to enable the receiving packet network gateway to generate comfort noise.

35 In one exemplary embodiment of the invention, in which a mobile-to-mobile call is routed from one MSC via a first packet network gateway, a packet network, and a second packet network gateway to a second MSC, the coding mode negotiations can be performed for example as follows. During call set up, TFO connections are first

set up between the transcoder unit and the packet network gateway at both ends, after which the packet network gateways negotiate the coding mode between them. If the same coding mode was selected at both ends, the establishment of the connection can be continued. If different coding modes were selected, one of the
5 packet network gateways can renegotiate the coding mode selected at the corresponding end of the connection. Alternatively, one of the packet network gateways can perform transcoding, i.e. conversion between the coding modes.

10 In a further advantageous embodiment of the invention, two packet network gateways can negotiate between themselves about compressing a signal transmitted between them, even if the systems at either end of the connection do not use or support compression. Preferably this is performed only in the case that during call set up, the packet network gateways receive information indicating that the call is a speech connection, and not a data or a fax call.

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E. PROTOCOLS

In a further advantageous embodiment, a higher level transmission protocol is used on top of the packet network level protocol between the two communicating packet
20 network gateways. For example, the IP protocol does not guarantee delivery of data, and the IP protocol has no mechanisms for replacement of faulty or missing datagrams. Neither does the IP protocol guarantee the correct receive order of datagrams. Therefore, a second protocol is advantageously used on top of the packet network level protocol such as the IP or the X.25 protocol to enhance the reliability
25 of data transmission between the packet network gateways. In such an embodiment of the invention, the data is inserted in a packet of the higher level protocol, after which the packet of the higher level protocol is inserted into one or more packet network level protocol datagrams for transmission over the packet network. The packet network gateways execute the higher level protocol, generating messages and
30 replying to messages as required by the specifications of the particular protocol. However, it is also possible in other embodiments of the invention to implement the execution of the higher level protocols using a separate network element between an packet network gateway and the packet network.

35 If the packet network gateway receives a packet network level protocol datagram addressed to an address within the plurality of addresses managed by the packet network gateway, and which datagram does not contain data which the packet network gateway recognizes as valid speech data and does not contain any

messaging data pertinent to a protocol used in the transmission of the speech data, the packet network gateway preferably discards the packet.

5 In one embodiment of the invention, the well known TCP protocol (Transmission Control Protocol) is used. However, the TCP protocol is not very well suited for real time transmission, wherefore other protocols are preferred. A further alternative is the UDP protocol (User Datagram Protocol) or the RTP protocol (Real Time Protocol), which is designed for transmission of real time data. The TCP protocol is defined by the specification RFC 791, UDP by RFC 768, and RTP by RFC 1889.
10 Other suitable protocols are the PPP protocol (Point-to-Point Protocol) defined in RFC 1661, PPP protocol in HDLC-like framing as defined in RFC 1662, or the V.110 or V.120 protocols.

15 Further, more than two protocols can be used on top of each other. For example, the RTP protocol is preferably used on top of the UDP protocol, which is used on top of the IP protocol.

These protocols are well known by a man skilled in the art, wherefore they are not described in further detail in this specification.

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F. AN EXAMPLE OF A METHOD

Figure 1 illustrates a method according to an advantageous embodiment of the invention for transmission of data arriving from a PCM transmission line through an
25 IP network to another PCM transmission line. First, in step 205, data is collected from the PCM line, from one or more channels i.e. time slots. If any of the channels contains a TFO mode signal, the compressed speech parameters are extracted from the data at step 210. In the following step 215, the IP address for the IP datagram is determined for example in some of the ways described previously.

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Preferably, the IP address is stored in a memory means for later use. Thereafter, when another IP datagram containing data from the same channel or channels is to be sent, the determination step 215 can simply comprise fetching of the previously determined IP address from the memory means.

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In the following step 220, the IP datagram is constructed, whereafter the datagram is transmitted through the IP network in step 225. After the destination packet network gateway receives the datagram, it extracts the data samples from the datagram in

step 230. In case that the data contains compressed speech parameters, the compressed speech parameters are decompressed to speech signal data in step 235. In the next step, the received and/or decompressed data are sent to corresponding channels of the PCM line connected to the destination packet network gateway.

The method shown in figure 1 is only an example of an embodiment of the invention. The invention can be realized in many other ways as well. For example, the ordering of steps 210, 215, and 220 can be different from that shown in Figure 1 in various embodiments of the invention.

G. AN EXAMPLE OF A NETWORK ELEMENT

Figure 2 illustrates one example of an embodiment of the invention, in which the inventive functionality is realized in a network element 300 located between a MSC 160 and a IP network 170. The network element preferably comprises a processor unit 310 such as a digital signal processor 310 for realizing the functions of the network element. For example, the network element may comprise an IP address generating unit 301 for generating IP addresses for IP packets based at least partly on parameters identifying at least one channel of the PCM transmission line. Further, the network element may comprise a compressed speech parameter extraction unit 302 for extracting compressed speech parameters from at least one signal from the PCM transmission line, which signal comprises both an uncompressed speech signal part and compressed speech parameters. The network element may also comprise a compression unit 303 for compressing the signal of at least one channel from the PCM transmission line before transmission over the data transmission network. The address generating unit 301, speech parameter extraction unit 302 and the compression unit 303 may advantageously be realized using software programs executed by the processing unit 310 stored in a memory means 315 in the network element 300.

H. CALL SET-UP

The information about the packet network level protocol address of the destination packet network gateway can be obtained by the sending packet network gateway for example during call set up. In the following, one example of call setup signalling according to an advantageous embodiment of the invention as applied to an IP network is described. In this embodiment, the switching centers supporting IP traffic are implemented in such a way, that they return an IP address instead of a

conventional E.164 telephone number as a response to a routing info request from another switching center.

5 In this example, it is assumed that switching centers having IP traffic capability can be recognized by the telephone numbers corresponding to the SC:s. The switching centers may for example have a database specifying which other switching centers support IP traffic.

10 In this example, messaging between switching centers (SC) A and B is described. In the case of a cellular telecommunications network, the two switching centers can be mobile services switching centers (MSC:s).

15 When a subscriber makes a call, SC A receives a SETUP message of the ISUP protocol. The SETUP message comprises the number of the other party, which the subscriber wishes to call. Switching center A examines the number, and if the analysis of the digits implies that SC B can receive IP traffic, SC A interrogates SC B by sending e.g. a "Send Routing Info" command to SC B using the signalling system SS7. Upon receiving the command, SC B locates a free incoming channel in the transmission line between SC B and its local packet network gateway, generates an IP address corresponding to the channel, and sends the IP address back as a response to the command. When SC A receives the IP address, it switches the connection to the packet network gateway associated with SC A, and sends the IP address to the packet network gateway to be used as the destination IP address. The packet network gateway of SC B can subsequently obtain the IP address of the channel in the packet network gateway of SC A from the source IP address of IP datagrams sent by the packet network gateway of SC A.

20 25 30 35 The interrogation command mentioned in the previous paragraph can be specific to IP traffic supporting switching centers, in which case a SC receiving such an interrogation command always knows that the sender of the command also supports IP traffic. Consequently, a SC can always reply to such a command by sending an IP address instead of an E.164 telephone number. According to another embodiment of the invention, a second switching center receiving such an interrogation command from a first switching center examines information identifying the first switching center, e.g. the telephone number of the calling party. If the telephone number identifies that the first switching center supports IP traffic, the second SC can reply by sending an IP address. Otherwise, the second SC replies in the conventional way by sending an E.164 telephone number.

I. FURTHER ADVANTAGEOUS EMBODIMENTS OF THE INVENTION

5 In a further advantageous embodiment, the packet network gateways also comprise functionality necessary for transcoding between various encoding modes. Such a functionality in addition to the previously described negotiation functions are in the present embodiment used for optimizing of the number of transcodings within the transmission path.

10 In the present embodiment, the object of minimization is the number of transcodings, if any, in the end-to-end transmission path. For obtaining this aim, a special ordering is used in the messages transmitted between the various network elements for describing the capabilities of the elements regarding supported coding modes. Such messages are often called terminal capability set (TCS) messages.
15 Such messages typically list the coding modes which the sender of the message can receive and which ones the sender can transmit. In this application, the item describing a coding mode is denoted a capability descriptor, a term which is also used for this purpose in some specifications of cellular telecommunication systems. The available coding modes may be different for different directions. In the present
20 inventive embodiment, the order in which the capabilities is listed in a terminal capability set message is given significance, i.e. the listing order signifies an order of preference.

25 The order of the capability descriptors is defined by certain set of rules, which the network elements follow when transmitting a terminal capability set message to the next network element along a transmission path. Basic considerations for these rules are the following:

- Those coding modes, which the previous network node supports and which the current network node supports, have highest preference. Preferably, the current
30 network node maintains the preference order of the previous network node if the following considerations do not require a change in the order, and at least partially, if the order needs to be changed.
- After these, those coding modes have the next highest preference, which coding modes the previous network node does not support, but which coding modes are
35 supported by the current network node, and for which modes the current network element can act as a transcoder, transcoding to/from a coding mode supported by the previous network node.

- Symmetrical encodings are preferred over asymmetrical encodings. In symmetrical encoding, the same codecs are used for transmission and for reception.

5 As an example, let us consider the flow of TCS messages in a network as shown in figure 3. Figure 3 shows schematically a first terminal TA 400, a first packet network gateway G1 300, a packet network 170, a second packet network gateway G2 300, and a second terminal TB 400. Let us consider a situation, in which the first terminal TA communicates its capabilities to the other terminal TB. Similar
10 procedure applies in the reverse direction, but for clarity, we discuss here only the direction from TA to TB.

First, the terminal TA transmits a TCS message to G1, listing the capability descriptors in a desired order of preference.

15 Next, the first gateway G1 receives the message, and prepares a new TCS message for transmission to gateway G2. Gateway G1 arranges the capability descriptors in the following way:

- those capability descriptors which TA sent and which G1 is capable of supporting form a first set of capability descriptors
- 20 - among these capability descriptors in the first set, the capability descriptors of symmetrical coding modes form a second set, while the rest of the capability descriptors of the first set form a third set
- the second set is ordered in the same order in which these capability descriptors were in the TCS message received by G1
- 25 - the third set is ordered in the same order in which these capability descriptors were in the TCS message received by G1
- a fourth set of capability descriptors is formed by those capability descriptors, which correspond to reception coding modes supported by G1 and not supported by TA, but which modes the gateway G1 can receive and which modes G1 can
30 transcode to a coding mode supported by TA
- a fifth set of capability descriptors is formed by those capability descriptors, which correspond to transmission coding modes supported by G1 and not supported by TA, but which modes the gateway G1 can transmit and to which G1 can transcode from a coding mode supported by TA.
- 35 The TCS message transmitted by the G1 then comprises the second, third, fourth and fifth sets of capability descriptors, in that preference order. However, the order of the fourth and fifth sets can also be the other way around.

Next, the second gateway G2 receives the message, and prepares a new TCS message for transmission to the second terminal TB. Gateway G2 arranges the capability descriptors in the following way:

- those capability descriptors which G1 sent and which G2 is capable of supporting
- 5 form a first set of capability descriptors
- among these capability descriptors in the first set, the capability descriptors of symmetrical coding modes form a second set, while the rest of the capability descriptors of the first set form a third set
- the second set is ordered in the same order in which these capability descriptors
- 10 were in the TCS message received by G2
- the third set is ordered in the same order in which these capability descriptors were in the TCS message received by G2
- a fourth set of capability descriptors is formed by those capability descriptors, which correspond to reception coding modes supported by G2 and not supported by
- 15 G1, but which modes the gateway G2 can receive and which modes G2 can transcode to a coding mode supported by G1
- a fifth set of capability descriptors is formed by those capability descriptors, which correspond to transmission coding modes supported by G2 and not supported by G1, but which modes the gateway G2 can transmit and to which G2 can transcode from
- 20 a coding mode supported by G1.

The TCS message transmitted by the G2 then comprises the second, third, fourth and fifth sets of capability descriptors, in that preference order. However, the order of the fourth and fifth sets can also be the other way around.

- 25 Finally, the second terminal TB receives the TCS message from gateway G2, and preferably selects for reception a coding mode which it can receive, and of those coding modes, the one having the highest preference.

- 30 One natural way of listing the capability descriptors is that the most preferred capability descriptor is listed first of all capability descriptors in the terminal capability set message, and following the most preferred one, the other ones in a decreasing order of preference. As a man skilled in the art perceives, the correspondence of the listing order and the preference order can also be defined the other way around.

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Figure 4 illustrates one configuration of the transmission path according to an advantageous embodiment of the invention. This embodiment illustrates the possibility, that more than two network element within the transmission path have

transcoding capability, i.e. can take part in negotiating and effecting TFO mode operation. In this embodiment, the terminals TA and TB 400 are mobile communication means. The speech data in this example traverses from one terminal through a TRAU (Transcoder and Rate Adaptor Unit) 410 to a packet network gateway 300, and through the packet data network 170 to another packet network gateway 300 and TRAU 410, and finally to the other terminal 400. In this embodiment, both gateways G1, G2 and both TRAU units 410 have transcoding capability. The ordering scheme according to preference described in relation to figure 3 is used also in this embodiment. The previously described scheme for ordering the capability descriptors in the terminal capability set messages ensures, that if there is at least one coding mode supported by all of these network elements having transcoding capability, such a coding mode will be selected for transmission of speech data. Further, the previously described scheme also minimizes the number of transcodings, if one common transcoding mode cannot be found. Since the preference order is carried within the TCS message, no other signalling about the preference order needs to be performed in order to optimize the transmission.

Figure 5 illustrates a method according to an advantageous embodiment of the invention. Figure 5 illustrates steps during connection setup phase, when terminal capability set messages are sent. According to this embodiment, a message listing supported coding modes in an order of preference is generated 510. Next, the message listing supported coding modes is transmitted from a network element to the next network element in the transmission path. After these steps, other steps necessary for setting up a connection can advantageously be performed, before beginning the transmission of actual speech data. Transmission of speech data can for example be performed according to the method shown in figure 1.

J. Further considerations

The invention has several advantages. For example, the collection of data from a plurality of channels to a single data packet reduces the packetizing delay for a single channel, i.e. the time needed for collecting enough samples for filling the data packet. Consequently, the size of the packets can be large, which assists in optimization of the effectivity of data transfer over the packet network, without the large size of the packets increasing the packetizing delay by an inordinate amount. Further, the number of packet connections can be lower than the number of transmitted channels, which reduces the amount of transmission overhead per a transmitted channel.

The packet network may be in various embodiments of the invention for example an internal network of a building or an organization, i.e. an intranet, or a large network, such as the world-wide Internet network. The invention is not limited to any specific
5 packet network. The packet network may for example be a network employing the IP protocol, the X.25 protocol, or for example the CLNP (Connectionless Network Protocol) protocol as the network level protocol.

A single MSC can in various embodiments of the invention be connected to more
10 than one packet network gateway. Also, the functionality of more than one packet network gateway may be realized within a single MSC.

As described in the prior art, the term PCM transmission line is used in this specification to refer to a transmission line, which comprises a plurality of channels.
15 The transmission line may be for example a 2048 kbit/s trunk line or a 1544 kbit/s trunk line, or a higher level line comprising a plurality of such trunk lines. The invention is not limited to any specific transmission line type. The term PCM transmission line is used only as an example of a transmission line with the intention of presenting an as clear description of the invention as possible, which term is well
20 known by a person skilled in the art and which term is commonly used for a general transmission line in the jargon of the art. However, for reasons of clarity and accuracy the term circuit switched transmission line is used in the claims for denoting such a transmission line comprising a plurality of channels. Correspondingly, a channel of such a transmission line is in the claims referred to as
25 a circuit switched channel.

In various embodiments of the invention, the previously described functionality described as associated with a packet network gateway can be realized using also other network elements as a packet network gateway. For example, the creation of
30 data packet payloads comprising data from compressed data channels can also be realized in a transcoder unit (TRCU), which converts channels from a 16 kbit/s channel used in a base station subsystem (BSS) to a 64 kbit/s channel, which is the basic transmission channel handled by a MSC. Since transcoder units typically participate in the TFO mode negotiations, the creation of data packet payloads
35 comprising compressed data in the transcoder units would simplify the arrangements necessary for the TFO mode negotiations, i.e. could even remove the need of packet network gateways to participate in the TFO mode negotiations.

Most of the packet network gateway functionality may as well be implemented in the TRCU. In such an embodiment, the TRCU creates the data packets and forwards the data packets to the MSC in a normal circuit switched connection. The MSC switches the signal to a network element of the packet network. This network
5 element extracts the packets from the circuit switched data stream and sends them forward in the packet network layer protocol format as described previously. In such an embodiment, the TRCU can create also higher level protocol structures used in the transmission of data over the packet network, i.e. for example PPP protocol structures carried in network level protocol packets.

10 Previously, some examples were presented of a predefined rule for generating an IP address based on PCM channel information. In an advantageous embodiment of the invention, network elements participating in the data transmission negotiate between themselves, which rule will be used. Advantageously, the negotiation may be
15 performed between the packet network gateways. In a further advantageous embodiment of the invention, the rule is negotiated by the MSC:s connected to the packet network gateways.

20 The name of a given functional entity, such as the base station controller, is often different in the context of different cellular telecommunication systems. For example, in the UMTS (Universal Mobile Telecommunication System) system the functional entity corresponding to a base station controller (BSC) is the radio network controller (RNC). Therefore, the particular terminology used to denote various functional entities in this specification are only examples according to the
25 GSM system, and do not limit the invention in any way.

The invention can be used in many different cellular telecommunication systems, such as the GSM or the UMTS systems.

30 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention. While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention.

Claims

1. A method for transmission of data over a data transmission network employing a network layer protocol from a first network node receiving data from a first circuit switched transmission line to a second network node transmitting data into a second circuit switched transmission line **characterized** in that the destination address of a network layer protocol datagram comprising data received from the first circuit switched transmission line for transmission to the second network node, is determined from
- circuit switched channel identifying parameters identifying at least one channel in the second circuit switched transmission line, and
 - the network layer protocol address of the second network node, according to a predefined rule.
2. A method according to claim 1, **characterized** in that the network layer protocol is the IP protocol.
3. A method according to claim 1, **characterized** in that the network layer protocol is the X.25 protocol.
4. A method according to claim 1, **characterized** in that data from at least one channel from the first circuit switched transmission line is transmitted in compressed form over the data transmission network.
5. A method according to claim 4, **characterized** in that of a signal received from a channel of the first circuit switched transmission line, which signal comprises both an uncompressed speech signal part and compressed speech parameters, only said compressed speech signal parameters are transmitted over the data transmission network.
6. A method according to claim 4, **characterized** in that that the signal of at least one channel from the first circuit switched transmission line is compressed in the first network node.
7. A method according to claim 4, **characterized** in that compressed speech parameters received from the first network node, are decompressed into an uncompressed speech signal before transmission into the second circuit switched transmission line.

8. A method according to claim 1, **characterized** in that samples of data from more than one channels from the first circuit switched transmission line are transmitted over the data transmission network in one network layer protocol datagram.

9. A method according to claim 1, **characterized** in that the method comprises steps, in which

- a message describing the supported coding modes for compressed speech parameters is transmitted from the first network node to the second network node, and
- said supported coding modes are described in said message in an order of preference for optimizing speech data transmission.

10. A network element for connection of a circuit switched transmission line to a data transmission network employing a network layer protocol, **characterized** in that the network element comprises a network layer protocol address generating unit for generating network layer protocol addresses for network layer protocol packets based at least partly on parameters identifying at least one channel of the circuit switched transmission line.

11. A network element according to claim 10, **characterized** in that the network layer protocol is the IP protocol.

12. A network element according to claim 10, **characterized** in that the network element comprises a compressed speech parameter extraction unit for extracting compressed speech parameters from at least one signal from the circuit switched transmission line, which signal comprises both an uncompressed speech signal part and compressed speech parameters.

13. A network element according to claim 10, **characterized** in that the network element comprises a compression unit for compressing the signal of at least one channel from the circuit switched transmission line before transmission over the data transmission network.

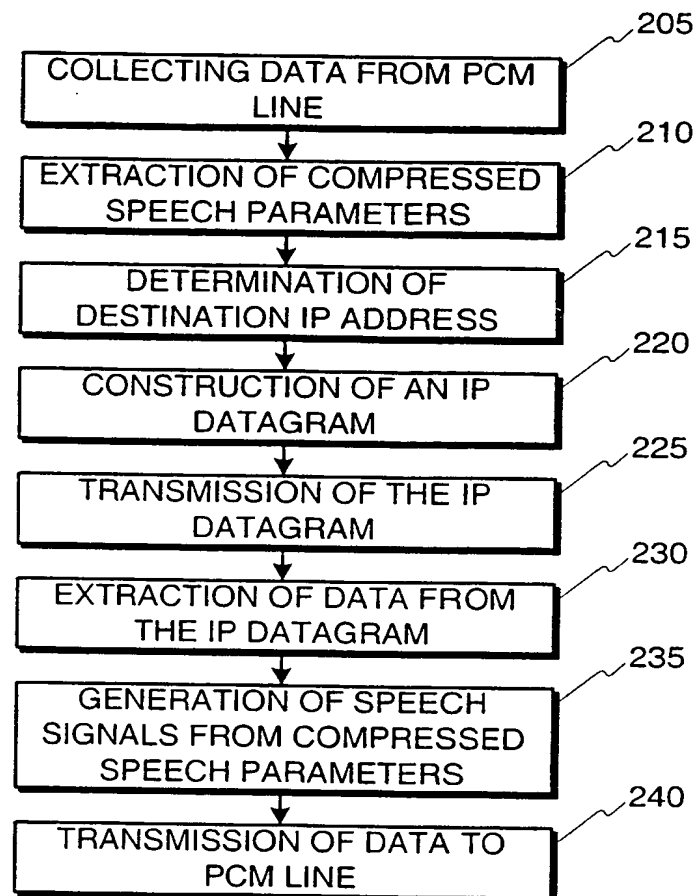


Fig. 1

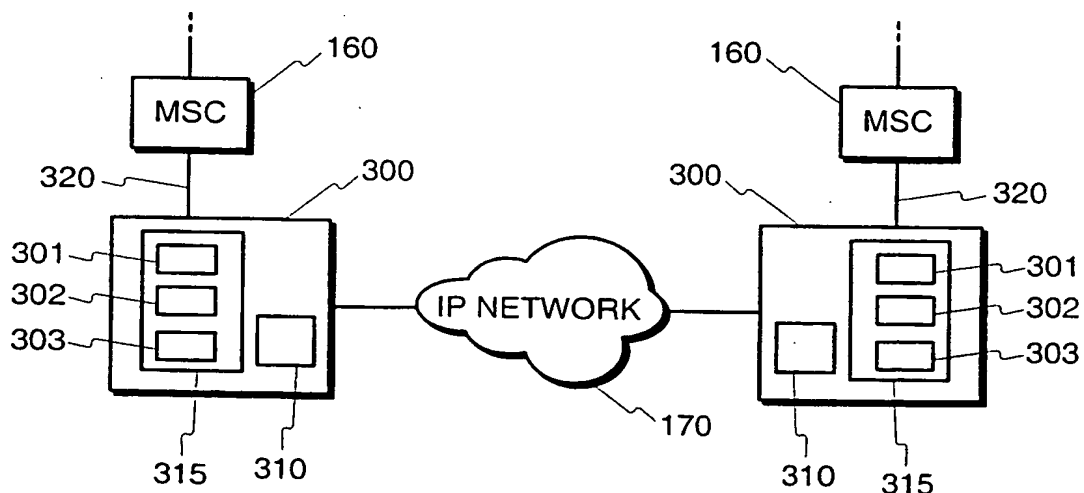


Fig. 2

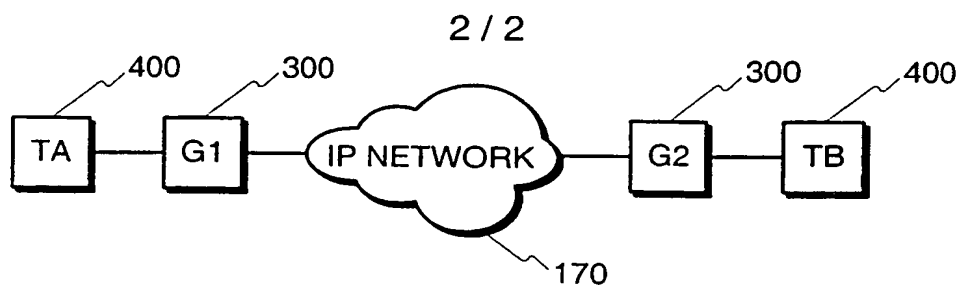


Fig. 3

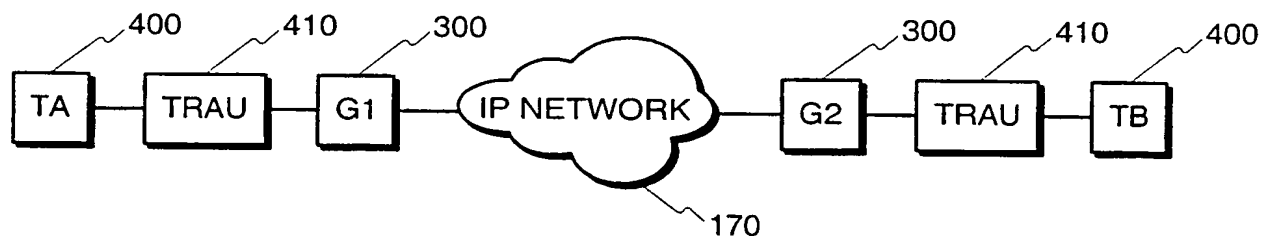


Fig. 4

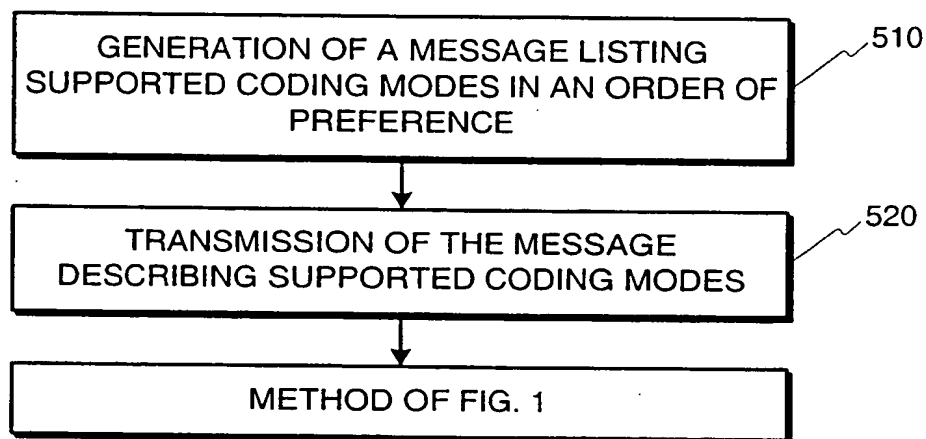


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/30845

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04L 12/66

US CL : 370/352

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 370/352,356,389,401,466

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US 5,867,494 A (KRISHNASWAMY et al.) 02 February 1999, figs. 1C-1D, 3, 10A, 10B, 11, 15, 16, 19A, 19C, 19F, 19G, 21, 30, 31, 52A, 80, 81, col. 1, lines 8-40, col. 11, line 27- col. 12, line 5, col.13, line 18- col. 16, line 64	1-13
A	US 4,958,341 A (HEMMADY et al.) 18 September 1990, abstract.	1-13
A	US 5,608, 786 A (GORDON) 04 March 1997, abstract.	1-13
A	WO 97/28628 (LIN) 07 August 1997, abstract.	1-13

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y*	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G*	document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means		
P document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

11 MARCH 2000

Date of mailing of the international search report

25 APR 2000

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Facsimile No. (703) 305-3230

Authorized officer
Enrique L. Santiago
Enrique L. Santiago

Telephone No. (703) 306-5908

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/30845

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	YANG, C. INETPhone: Telephone Services and Servers on Internet, RFC 1789, University of North Texas. April 1995, pages 1-6.	1-13